REMARKS

Claims 1-22 are pending in this application. The Office Action dated February 5, 2003, rejected claims 1, 6, 7, and 9-14 and objected to claims 2-5, 8 and 15-22. Applicants have amended claims 1-4, 17 and 19-22 to correct informalities and further clarify the subject matter of the claimed invention. No new matter has been added.

Claim objections

Claims 1-4 and 19-22 are objected to because of informalities. Claim 1 has been amended to provide proper antecedent bases for the limitations "the remote sensor circuit" and "the programmable current source." A controller (for example, controller 116) that is configured to generate the first through fourth control signals has been added as a limitation to claim 1 to set forth which structural element of the claimed system generates the control signals. Claims 2-4 have been amended to complement the terms "value(s)" and "average(s)" to clarify these terms. Claim 17 has been amended to correct a typographical error. Claims 19-22 have been amended to correct the preambles such that the claims are directed towards systems. Applicant has reviewed the claims and submits that the claims are in proper form for allowance.

Claim rejections under 35 USC § 102

Claim 1 was rejected under 35 U.S.C 102(b) as being anticipated by Hinrichs, et al. (U.S. Pat. No. 5,453,682, hereinafter Hinrichs). Regarding claim 1, applicants submit that Hinrichs fails to teach or suggest a system for determining temperature that comprises a controller that is configured to selectively apply a first control signal to the programmable current source at a first time such that the associated level of the bias current at the first time corresponds to the first current level; a second control signal to the programmable current source at a second time such that the associated level of the bias current at the second time corresponds to the second current level; a third control signal to the programmable current source at a third time such that the associated level to the bias current at the third time corresponds to the second current level; and a fourth control signal to the programmable current source at a fourth time such that the associated level of the bias current at the fourth time corresponds to the first current level. Instead, Hinrichs generally discloses a switched constant current source that provides a bias current to the PN junction when activated. There is no teaching or suggestion in Hinrichs that the switched

constant current source of Hinrichs produces a bias level at a first time that corresponds to a first current level, a bias level at a second time that corresponds to a second current level, a bias level at a third time that corresponds to the second current level, and a bias level at a fourth time that corresponds to the first current level. Accordingly, Hinrichs fails to meet the structural limitations recited in claim 1. For at least this reason, claim 1 is submitted to be patentable and allowance is solicited.

Claim rejections under 35 USC § 103

Claim 14 was rejected under 35 U.S.C. 103(a) as being unpatentable over Aslan et al. (U.S. Patent No. 6,149,299, hereinafter Aslan). Claims 1, 6, 7, 9, 10, 11, 12, and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Miranda Jr., et al. (U.S. Pat. No. 6,097, 239, hereinafter Miranda) in view of Davidson et al. (U.S. Pat. No. 5, 639, 163, hereinafter Davidson).

Regarding claim 14, Aslan fails to teach or suggest a method of determining a temperature from a remote sensor comprising applying a sequence of first and second current levels to a remote sensor circuit at a first time, wherein the sequence is selected from a random sequence, a pseudorandom sequence, and an ordered sequence, wherein the ordered sequence comprises a first selected current level that is applied at a first and a last time and a second selected current level that is applied at a second and a next-to-last time. Instead, Aslan discloses a first current that is applied at time $\Delta T1$ and a second current that is applied at time $\Delta T2$ (col. 8). This sequence does not comprise a first selected current level that is applied at a first and a last time and a second selected current level that is applied at a second and a next-to-last time.

Furthermore, Aslan teaches using two measurements that are sequential to eliminate an error term due to substrate injected noise voltage (col. 7, lines 47-48). This teaches away from the present disclosure, wherein the invention can be used to compensate for temperature changes, which are not random, atomic noise, but are instead related to environmental factors. Accordingly, applicant traverses the assertion that one of ordinary skill in the art at the time the invention was made would consider the particular order sequences options recited for the claimed method to be an obvious modification to the method of Aslan, that will allow resolving the same problem of eliminating the error term (of substrate injected thermal noise) for

determining the temperature measured by the sensor. Thus, Aslan fails to teach or suggest applying an ordered sequence as limited by the claim. For at least this reason, claim 14 is submitted to be patentable and allowance is solicited.

Regarding claim 1, applicants submit that Miranda and Davidson fail to teach or suggest a system for determining temperature that comprises a controller that is configured to selectively apply a first control signal to the programmable current source at a first time such that the associated level of the bias current at the first time corresponds to the first current level; a second control signal to the programmable current source at a second time such that the associated level of the bias current at the second time corresponds to the second current level; a third control signal to the programmable current source at a third time such that the associated level to the bias current at the third time corresponds to the second current level; and a fourth control signal to the programmable current source at a fourth time such that the associated level of the bias current at the fourth time corresponds to the first current level. In contrast, the programmable current circuit Miranda provides a bias current to the PN junction when activated. There is no teaching or suggestion in Miranda that the programmable current circuit produces a bias level at a first time that corresponds to a first current level, a bias level at a second time that corresponds to a second current level, a bias level at a third time that corresponds to the second current level, and a bias level at a fourth time that corresponds to the first current level.

Moreover, Davidson fails to teach or suggest the recited controller. Davidson generally discloses a pair of on-chip thermal sensing diodes that are formed together and interconnected with a common cathode to form a differential sensing pair. Davidson does not disclose a controller as recited by claim 1. Accordingly, Miranda and Davidson fail to meet the structural limitations recited in claim 1. For at least this reason, claim 1 is submitted to be patentable and allowance is solicited. Claims 6, 7, 9, 10, 11, 12, and 13 depend from claim 1 and are submitted to be allowable for at least because they depend from an allowable independent claim.

Attached hereto is a marked up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 1-4, 17 and 19-22 have been amended as follows:

1. (Amended) A system for determining temperature from a remote sensor circuit that includes a PN junction, comprising:

a programmable current ~~circuit~~ source that is coupled to the remote sensor circuit such that the programmable current circuit provides a bias current to the PN junction when activated, wherein the bias current has an associated level that is selected from at least a first current level and a second current level;

a controller configured to selectively apply:

a first control signal ~~that is applied~~ to the programmable current source at a first time such that the associated level of the bias current at the first time corresponds to the first current level;

a second control signal ~~that is applied~~ to the programmable current source at a second time such that the associated level of the bias current at the second time corresponds to the second current level;

a third control signal ~~that is applied~~ to the programmable current source at a third time such that the associated level of the bias current at the third time corresponds to the second current level; and

a fourth control signal ~~that is applied~~ to the programmable current source at a fourth time such that the associated level of the bias current at the fourth time corresponds to the first current level;

a converter that includes an input that is coupled to the remote sensor circuit, and an output that is configured to provide voltage values that correspond to a voltage across the PN junction at the first, second, third, and fourth times; and

a processor that is coupled to the output of the converter, wherein the processor calculates a temperature value in response to the voltage values that are produced at the first, second, third, and fourth times.

2. (Amended) The system of claim 1, the processor comprising:

a first average calculator that is arranged to provide a first temperature average in response to the voltage values from the first and fourth times;

a second average calculator that is arranged to provide a second temperature average in response to the voltage values from the second and third times; and

a temperature calculator that is arranged to calculate the temperature value in response to the first and second temperature averages.

3. (Amended) The temperature sampling system of claim 2, the first average calculator further comprising:

an adder that is arranged to provide a sum of the voltage values from the first and fourth times; and

a divider that is arranged to provide the ~~sum~~ temperature value by dividing the sum of the voltage values by a factor equal to the number of the voltage values from the first and fourth times.

4. (Amended) The temperature sampling system of claim 1, the processor further comprising:

a first subtracter that is arranged to provide a first difference in response to the voltage values from the first and second times;

a first temperature calculator that is arranged to provide a first initial temperature in response to the first difference;

a second subtracter that is arranged to provide a second difference in response to the voltage values from the third and fourth times;

a second temperature calculator that is arranged to receive the second difference as an input and provides a second initial temperature as an output in response to the second difference; and

an average calculator that is arranged to calculate the temperature value in response to the first and second initial temperatures.

17. The method of claim 14, wherein the method for applying the sequence of the first and second current levels further comprises applying a third current level to a remote sensor circuit and wherein the ~~steop~~ step of determining the temperature value further comprises determining the temperature value from the third current level.

19. A ~~method~~ system of determining a temperature from a remote sensor, comprising:

means for producing a first current level;

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means for producing a second current level that is different from the first current level;

means for applying a sequence of the first and second current levels to the remote sensor circuit, wherein the sequence is selected from a random sequence, a pseudorandom sequence, and an ordered sequence, wherein the ordered sequence comprises a first selected current level that is applied at a first and a last time and a second selected current level that is applied at a second and a next-to-last time;

means for measuring first voltages from the remote sensor circuit when the first current level is applied;

means for measuring second voltages from the remote sensor circuit when the second current level is applied;

means for determining a temperature value from the first and second measured voltages.

20. The ~~method~~ system of claim 19, wherein the temperature value is calculated by:

means for determining a first average using the first measured voltages;

means for determining a second average using the second measured voltages; and

means for using the first and second averages to calculate the temperature value.

21. The ~~method~~ system of claim 19, wherein the temperature value is calculated by:

means for determining a first difference between the first and second measured voltages when the first current level applied is followed by the application of the second current level;

means for determining a second difference between the first and second measured voltages that occur upon the change from applying a second current level to applying a first current level; and

means for calculating the temperature value from the first and second differences.

22. The ~~method~~ system of claim 19, wherein the means for applying the sequence of the first and second current levels further comprises means for applying a third current level to a remote sensor circuit and wherein the means for determining the temperature value further comprises means for determining the temperature value from the third current level.

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